tion of the stone or brickwork is extremely slow, and never can follow up that of the metal, and, accordingly, is compelled to remain, very nearly where it was thrust or forced by the metal. This operation of expansion and contraction being constantly proceeding, the masonry or brickwork soon become unsteady by detachment from the mortar or cement. Again, if an iron plate be inserted in a wall for giving it support, and then to disguise this it be plastered over, the consequence is, that in a very short time the plaster will be cracked by the expansion of the metal beneath.

The coping stones of walls are frequently but most injudiciously held together by cramps of iron "firmly imbedded in lead," and such pieces of metal, if of cast-iron, which is brittle, often break during the first frost, from a tendency to contract by the cold more than the stonework will permit; or if they be made of wrought-iron, which is tough, then, instead of rupturing, they generally rupture the stonework, and so loosen themselves from their leaded sockets. Then in the construction and setting of iron stoves or fire grates, the expansion and contraction of metal requires to be well investigated, and to be well guarded against, or in a short time the whole arrangement will become ricketty; unsightly gaps and chinks will appear around the metal work, and not unfrequently the marble chimney-piece will be distorted from its true position, or even broken.

These are all instances in which chemistry may be advantageously applied to construction, and the principles of the science likewise demonstrate to the architect and builder that in their attempts to heat edifices by hot air, hot water, or steam, the pipes for the conveyance of such agents should never be rigidly fixed or firmly abutted against the walls or other solid obstacles, lest the pipes in expanding may cause distortion or eventually overthrow, and the same fact is applicable to the employment of iron beams, &c.

The chemical nature of atmospheric air, and its expansions and contractions by heat and cold, most imperatively demand attention from the architect and builder, for this wondrous medium is the very pabulum of all warming and ventilation. Atmospheric air is a *mixture* of the gaseous elements oxygen and nitrogen. Its changes of volume and of levity by alternations of natural or artificial temperature are great and sudden; and, to maintain air of a genial warmth without disturbing the relative proportions or characters of its elements, which would unfit it for the support of life; to give free egress to such portions as become chemically vitiated by respiration and combustion, whilst free ingress of pure air is at the same time abundantly allowed, are matters literally of vital importance, but of extremely difficult practical application.

Absolute ignorance, or wilful neglect of the chemical habitudes of the atmosphere, have opened a vast and fertile scope for quackery, not only as regards the futile attempts at warming and ventilating extensive and costly edifices, but in the construction of flues and chimneys of ordinary dwellings, so that the roofs are disfigured with abortive contrivances in the shape of creaking caps and clattering cowls, "to make the fires draw."

In these two introductory papers, on "Chemistry as applied to Construction," the writer has endeavoured to present a general outline of the nature of the science, the business of the chemist, the nature and properties of elements and compounds, and the extreme importance and utility of such knowledge to the architect and the builder. Having thus in some measure introduced the agents that are to be employed, the reader will be prepared for the particular discussion of the individual materials used in construction, for example, marble, stone, brick, mortar, cement, glass, and other vitrifications, paint and varnish, the metals, iron, copper, zinc, tin, and lead, and their alloys. These will afford a vast fund of useful information, and to them future papers will be devoted.

LEOMINSTER BUTTER-CROSS.—This ancient piece of architecture is now about being removed from its long resting place. A local paper says, "it will be placed on wheels, and moved to where some old houses now stand behind it."

DECORATIONS AT SIR ROBERT PEEL'S.

THE principal staircase of Sir Robert Peel's house, in Whitehall-gardens, has been decorated by Messrs. Collman and Davis in encaustic colours. This staircase is very simply arranged, the walls of the ground-floor being mainly taken up by a simple flight of steps to the principal floor, bearing four lofty panelled walls above; the whole of the ceiling is divided into numerous compartments, filled in with ground-glass, and forms one skylight. In the centre of the four principal panels are introduced, as chief subjects, the four seasons, represented in figures of considerable size, painted in relief on dark grounds. Beneath these are painted, in twelve smaller compartments, figures composed in reference to the principal subjects. Arabesque ornaments surround the centre paintings, and fill in between the others in fanciful devices, and also enrich the upper part and sides of the large panels, which are besides framed by a quietly coloured border connecting the whole. In the architectural members of the walls, cornice, and glazed ceiling, rich colour and gold is introduced to harmonize with the rest. The style of the decoration is of a classical character, in accordance with the architecture.

PROPOSED ARCHITECTURAL SOCIETY FOR STUDENTS AND DRAUGHTSMEN.

LAST week we printed the first part of a paper on the state of architectural education, read by Mr. Kerr, before the Association of Architectural Draughtsmen. This treated of present deficiencies, great and numerous enough! In the second portion of the paper, which we now give, a remedy is suggested.

The School of Design being provided for the preparation, there must now be had some powerful means of study to follow it up, build upon it, perfect, and apply it. And certainly for this period, and for this subject, a very valuable principle indeed is that upon which the system of mutual instruction and collective investigation is founded, which is so well known among us in the form of our many scientific societies. This principle I hold to be more valuably applicable in the early manhood than in any future period of life whatever; for in our every day public associations the main spring is always in the energy of an enthusiastic few,—apply the principle to youth, and this energy is that of an enthusiastic many—perhaps I might say an enthusiastic all. And even when the principle spreads into debate and controversy, still it is valuable,—perhaps even on this account the more valuable. We differ in opinion; we always have differed,—we always will. And this fact, which the thoughtless will set down as a curse of war lying upon fallen man, is in fact a beautiful scheme in Creation for effecting the grand purpose of Earth's advancement. Were we all of one mind, human nature would settle down and stagnate. But we are more wisely made, and by this very spirit of controversy,

> "Thro' the ages one increasing purpose runs,
> And the thoughts of men are widen'd by the process of the suns."

An Architectural Society for young men, if such could be properly established upon a broad basis, to be secure, its face in the right direction, and with a few good leaders to guide, would be, I confidently believe, a most powerful means of good architectural education. Laying hold of the architect's mind at the best period for the energy and thought required, and providing him with an excellent means of encouragement, the cordial study of the Art would be, I am persuaded, directly and most valuably produced. And particularly am I sanguine of its good effects in view of the peculiarities of our special subject. In the Institute of Architects the principle spoken of must be admitted, in so far as regards any incentive to study and research among its members, to have signally failed. A great cause of this is to be found in the undeniable fact that the younger members of the profession are, to all intents and purposes, completely excluded from any part in its transactions. The principle is applied too late in life: take the architect a few years earlier, when study and research are his element, and your expectation may be a very different result. The study which is demanded must be mainly over before the commencement of practice; complete establishment may be not improperly taken as equivalent to the complete extinction of the spirit.

It has been expressed as a fear that the supply of material—the production of essays and other subjects by the members—would be very likely a difficulty in the society proposed; but I cannot believe that it could fail through want of this support, if once fairly and properly working. My view of it rather is that, with a careful, spirited, liberal guidance at the commencement, and cordial attention on the part of a few leaders, the means of supply for material would soon admit of selection. With a hundred, or even fifty, young men earnestly engaging in such an association, surely the four-and-twenty subjects a year would be obtainable.

This society I would have to embrace the entire class of the young architect, from the Institute down to the youngest pupil. If any one be inclined to demur against his association, as a man in the omega of study, with the mere boy commencing the alpha, I would remind him that such argument would deprive the world of all its great ones—if it were beneath the dignity of a Socrates, or a Buonaparte, or a Washington, to associate with meaner men. Let it embrace the whole class, and upon a liberal spirit even then. For what is wanted is a society for this class, not like what our Institute is to the profession, but like what it ought to be.

The School of Design which I have spoken of would be simple in its nature. A proficient man takes charge of a small class of students for their instruction in Design. There might be several teachers for several branches, and junior classes and senior. The teachers' duty is to appoint subjects for design, and to criticise the designs presented. This is all I would propose as a commencement; but there might be classes for other matters,—construction, for instance, drawing, perspective, painting, practical work,—anything, in short, which might be found desirable. There are also many other amplifications which would fall within the province of architectural education; but a perfect School of Design would be of gradual, perhaps difficult, attainment.

This institution ought certainly to be supported by the Institute; but I fear we cannot expect it; and even if it were to be had, I should be suspicious at present of its government. I would connect it, therefore, with the Architectural Society which I have described. First, there appears no other means of obtaining that necessary support which the School of Design would thus obtain. Secondly, there would be a very valuable aid to the Society itself. Thirdly, I do not know where efficient instructors are at present to be had; and the Society would be, I believe, a speedy means of producing them,—for in six months I would expect a new school of architectural criticism to be established.

I have not been able to devote that careful study to my subject which is requisite, to be able to leave generalities for speciality and detail. My object has been, therefore, more to shew the grounds for the scheme, than to develop the scheme itself. The constitution of the society would have to be arranged carefully and deliberately. I would be exceedingly cautious in proposing at the present any decided principle of detail. But one or two passing observations might be made as a conclusion. The expenses of the Society ought to be as small as possible—the subscription money as nearly nothing as may be. Exclusiveness ought to be avoided carefully. Better to explode through liberality than to fall cold and dead through selfishness and scruple. I would also expect that teachers for the School of Design would be had for generosity and not fee—their trouble being made as small as possible, as much a pleasure as possible, and as much as possible an honour to be desired. Students' fees would be well to be nothing,—instruction free. Secret committee work must be none,—the government must be open, a management by delegates, not a dominion of rulers over subjects.

Now I have said what I have to say. I leave it for consideration and inquiry. For my own part I am only fully convinced that something of the kind I have described might

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